

# Smallholder Sugarcane Farmers' Interactions in Innovation Partnerships and Its Implication on Livelihoods and Food Security in Mumias Sub-County, Kenya

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## Abstract

Innovation Partnerships brings together stakeholders of diverse talents with complementary skills to foster mutual learning and development of creative ideas. The purpose of this study was to examine how smallholder sugarcane farmers in Mumias sub-County interact within innovation partnerships and what implications this has on their livelihood assets and opportunities for food security. The study was premised on the Social Network Theory, and interactions were triggered through an action learning process. To participate in the action learning process a sample of 50 smallholders was drawn from a target population of 1,907 smallholder sugarcane farmers in Lureko location, Mumias sub-County using asset based ranking. Data collection and analysis was a continuous and iterative process using various action research protocols at each stage of the process. The study observed that interactions fostered new ideas whose application brought positive change. A platform for knowledge incubation, exchange and spillover was provided through continued interactions, thereby building smallholder sugarcane farmers' networks and capabilities. Smallholders realized their potential and engaged in new opportunities to diversify livelihood strategies for improved health, income generation and food security.

**Keywords:** Smallholders, Livelihood assets, Innovation, Partnerships, Interactions, action-learning, Food Security

## 1. Introduction

Commercial sugarcane farming was introduced in Kenya as a preserve of large-scale farmers. However the need to boost sugar production led to smallholders becoming a critical mass in sugarcane production (Isabirye, *et al.*, 2013), with subsequent introduction of contract farming and out-grower models. Farmer organizations offered opportunities to exploit the potential of collective action in accessing assets and exploiting economies of scale in production and marketing (FAO, 2010). However, the current negative performance of out-grower organizations has increased smallholders' vulnerability to risks in sugarcane production. Their potential to improve livelihoods of smallholders and contribute to food security will therefore depend on a new generation of dynamic and alternative forms of innovation. Studies indicate that knowledge, is produced in a context of work and communicative interaction with other people (Sayer, 1992), and that innovation partnerships improve smallholders' access to credit, inputs, extension and markets (Houkonnou *et al.*, 2012). This study therefore examines interactions of smallholder sugarcane farmers in innovation partnerships and their implication on livelihood assets and opportunities for food security in Mumias sub-County, Kenya.

## 2. Background of the Study

The growing demand for bioethanol fuel and sugar influenced increasing quantities of sugarcane grown, with smallholders becoming a critical mass in sugarcane production (Isabirye, *et al.*, 2013). Smallholder sugarcane farms of less than 2 hectares represent well over 80% of farms in countries such as India, China, Mozambique and Ethiopia (Nagayets, 2005); and due to technological advancement and innovation these feed hundreds of millions of people. In Kenya sugarcane farming has failed to sustain livelihoods of smallholder farming households (Waswa, *et al.*, 2012), yet smallholders are relied upon to supply over 90% of the Kenya sugar industry's raw material requirement (KSB, 2013). According to Bajwa (2012) smallholder sugarcane farming in Pakistan only became competitive after the development of a tri partite collaboration between the processor, the Micro Finance Institution (MFI) and the smallholder sugarcane farmers. This means that while innovation partnerships brings together stakeholders of diverse talents with complementary skills to foster mutual learning and development of creative ideas (Smock, 1999); improved interaction helps to forge stronger linkages between stakeholders resulting in better information exchange, and more ideas and opportunities (Nederlof, *et al.*, 2011). This study therefore examines interaction of smallholder sugarcane farmers within innovation partnerships, and its implication on livelihood assets and food security in Lureko location, Mumias sub-County, Kenya.

## 3. Theoretical Framework

The study is grounded on the Social Network Theory (SNT) which views social relationships in terms of nodes

(individual actors within the networks) and ties (relationships between actors). SNT argues that the ability for individuals to influence their success rests more within the structure (social, political, economic) of their network; and that the attributes of individuals are less important than their relationships and ties with other actors within the network (Wasserman & Faust, 1994). The approach emphasizes that new knowledge and capabilities is developed by individuals and organizations through their interactions; and it is this new knowledge and capabilities that lead to innovation. Thus people who do better in a society are somewhat connected despite it being a market in which people exchange all varieties of goods and ideas in pursuit of their interests (Burt, 2001). Further still, people connected across groups are more familiar with alternative way of thinking and behaving, hence giving more options to select from and synthesize in developing new ideas (Burt, 2004). This means that efficiency of a society can improve by facilitating coordinated action and features of social organization such as trust, norms and networks (Burt, 2000). In Kenya, like many countries, innovation and Innovation Systems Perspective are identified as organizing principles in the various strategy documents, but not much has been done to effectively integrate them into the Agricultural Research and development (R&D) process. Minimal partnerships and interactions among stakeholders therefore undermines development of responsive research agendas, compromising smallholder farmers' access to knowledge.

#### 4. Literature Review

Partnerships and multi-stakeholder interventions have been found necessary in the formation of social, economic and organizational capital such as efficient farmer associations in the East and Southern African ACP Region (FAO, 2010). Diverse stakeholders shape their holistic efforts through collaborative partnerships; and strengthening linkages and interaction between actors is considered key to improved efficiency and effectiveness of Agriculture and rural development efforts (Hall, 2006). Through interactions new knowledge and capabilities are developed by individuals and organizations, and it is this new knowledge and capabilities that lead to innovation (Wasserman & Faust, 1994). The innovativeness of a partnership is reflected in the creativity exhibited in accomplishing complementarities and a convenient balance in the mobilization of partners (Clavel & Kibwika, 2010). In a multitude of cases smallholder farmers have been searching for new forms of collaboration so as to increase their bargaining position in the value chain (Rondot & Collion, 2001). However, they are usually at a disadvantage since they have little capital to invest, use traditional techniques, depends on family labor and lack contact with market players (De Janvry & Sadoulet, 2005).

In Kenya partnerships that include government, civil society organizations, private sector and national research institutions were found to accelerate the concept of value addition (Waswa, *et al.*, 2009). But, considering that most linkages do not reach the most poor and highly vulnerable, farmers tend to use a wide range of strategies and local innovations to manage and respond to ecological and socio-economic challenges (Milton & Ochieng, 2007). Multiple interactions between components of farming systems, supply chains and economic systems, policy environments, and societal systems are known to result to innovation (Klerks, *et al.*, 2015). According to Klerks, *et al.* (2010) innovation Partnerships extends beyond the creation of knowledge to encompass the factors affecting demand for and use of knowledge in novel and useful ways. This means that when smallholder farmers group themselves together in cooperatives and producer organizations they can become active in shaping their own path out of poverty, overcoming barriers they face, subsequently broaden their capabilities to play a greater role in meeting the world's growing food needs (McInerney, 2015). Opondo, *et al.* (2005) points out that actors identify and recognize their experimentation efforts, responsibilities, strengths and weaknesses through action learning, thereby strengthening participation and community innovation processes that build the their livelihoods. This study therefore employed action learning in strengthening smallholder sugarcane farmers' interactions within innovation partnerships, and examined its implication on livelihood assets and food security in Mumias sub-County Kenya.

#### 5. Methodology

The study adopted action research design whereby knowledge is generated, used, tested and modified in the course of the action research project (Jarvinen, 2009). This allowed for exploration of smallholder sugarcane farmers' interactions in innovation partnerships within its context, and its implications on livelihood assets and food security in Lureko Location, Mumias sub-County, Kenya. A sample of 50 smallholders was drawn from a target population of 1,907 smallholder sugarcane farmers in Lureko location, Mumias sub-County using asset base ranking tool. This was appropriate since qualitative studies require that the researcher be involved in substantial and time consuming interaction with a small group of subjects in order to examine behavior pattern, yet yield representative results (Stake, 1995). Lureko location was selected purposefully, based on priori information that it had individuals with characteristics relevant to the research questions. Interactions were triggered by developing and implementing an interactive inquiry process in a collaborative context, through an action learning process.

Interaction activities included information exchange through trainings, on-farm demonstrations,

experienced farmers acting as business coaches for less experienced farmers, and best practice meetings in which farmers discussed a theme of common interest relevant to the study. The study adopted a participatory approach to data collection using various action research protocols to collect continuous and iterative data at each stage of the process. Social network analysis tool was used to identify major constraints to interactions, most suitable partnerships for upgrading, and key points of intervention. To capture data on capacity for change and resilience an Appreciative Inquiry tool (AI) was used. Analysis of qualitative data was a cyclic process involving data collection, recording reflective notes and data analysis. This was undertaken throughout the research using data driven collaborative analysis and social network analysis. The information collected, a narrative with thick, rich description was classified, categorized and synthesized as per emerging action learning themes.

## 6. Discussion

The study examined the implication of smallholder sugarcane farmers' interactions in innovation partnerships on their livelihood assets and opportunities for food security in Mumias sub-County, Kenya. This section reports and discusses the key findings to show case outcomes of interactions among smallholder sugarcane farmers under the following sub-headings: growth in networks, strategic and leadership commitment to growth, innovation capacity and capability building, and the success of individual innovation projects.

### 6.1 Growth in networks

Opportunities for all actors to share their contacts and communicate freely were created during interactions, thus allowing for direct ties and connections. The study observed that personal contacts developed, promoted other interactions and new forms of collaborative relationships. Farmers were therefore located in an excellent position to monitor information flow and have visibility into what is happening in the network. This helped to avoid a central point of failure. A similar observation was made by Doloji (2009) that communication is the single most influencing factor impacting on relational partnering success. Among the emerging networks were the local vegetables, poultry, arrow roots and other tubers production networks.

As the objectives of the partnership became clearly defined, farmers were observed to be engage in more income generating activities, thus expanding the partnership, attracting new partners and creating new opportunities for knowledge exchange. Farmers for example developed partnerships with County Government, and under the Kenya Agricultural Productivity and Agribusiness Project (KAPAP) acquired a vegetable preservation equipment to support local vegetable production and marketing. Greater opportunities for cross-sector collaborative innovation was demonstrated, including novel partnerships initiated through interaction. This agrees with Nederlof, *et al.* (2011) that when an innovation partnership better defines its objectives and scope of work, its members may well realize that they miss the presence of important organizations or individuals. Strengthening innovation partnerships and interactions is therefore critical in linking smallholder farmers to networks essential for building their livelihood assets and opportunities for food security.

Some of the actors within the innovation partnership involved in other networks outside the main group were observed to be very important resources for fresh information not available inside the platform. Such actors played key roles in enhancing growth in networks by linking the innovation partnership to other networks. Some smallholders in the partnership previously involved in existing poultry and oil palm networks for example, were observed to link the partnership to other experts in their networks. This was key in initiation and growth of the poultry and oil palm clusters within the partnership. A similar observation was made by Lewin (1997) that networks with lots of loose connections to individuals outside the main network are more useful to the members than smaller, tighter networks within the network. Cassidy and Barnes (2012) further point out that farming households that are more socially networked are likely to have a wider range of livelihood strategies, greater levels of other forms of social capital, and greater overall capital, and are therefore more resilient. Promoting social networks through interactions and learning is therefore key to building livelihoods and broadening opportunities for food security.

New knowledge gained through interaction and learning process was observed to trigger growth in some existing but weak networks, such as the brick interlocking, dairy and fish production networks. The interaction process empowered actors to collect, analyze and use knowledge in promoting their livelihoods; and by applying new knowledge innovation partnership actors, formerly members of weak groups were able to attract some of their counter-parts and revive vulnerable networks. This finding agrees with Mayoux (2005) that interactions through action learning empowers vulnerable groups to collect, analyze and use information to improve their lives and gain more control over decisions which affect them. Thus interactions promotes growth in networks by empowering smallholders to make sound decisions.

### 6.2 Strategic and leadership commitment to growth

The level of trust demonstrated within every knowledge partnership was observed to increase and develop much faster than anticipated during interactions, promoting a culture of learning and commitment to shared values

while forging networks. A similar observation was made by Boschma (2005) that a climate of trust between actors facilitates collaboration. Formal and semi-formal structures were established to govern the innovation partnerships and promote collaboration. The leadership of partner clusters and umbrella group was observed to be internally cohesive, democratic, accountable and transparent, thus helping the effort of participants to innovate. Farmers were able to implement practical strategies for succession planning by identifying, supporting and retaining high potential leaders.

Strategic leaders at various levels were empowered to coordinate the clusters, while promoting growth in the main partnership with minimal follow-up by the researcher. Some of these leaders got integrated into sub-County Steering Committees, subsequently creating opportunities to facilitate linkages between the partnership, government and various stakeholders, besides attracting support from other organizations. This is in line with Clavel and Kibwika (2010) that the innovativeness of a partnership is reflected in the creativity exhibited in accomplishing complementarities and a convenient balance in the mobilization of partners. As a result of its innovativeness, the main partnership that was initially in an informal status was registered as a formal Co-operative association, thus gaining legitimacy in the governments' eyes and ensuring commitment in promoting smallholder sugarcane farmers livelihoods and food security. This agrees with Abenakyo, *et al.* (2008) that strengthening social asset such as networks, membership in groups, social relations and access to wider institutions in society, is a powerful way to improve communities. Thus strategic leadership and stronger convening power is critical to building social networks clusters likely to build other assets and promote food security.

### 6.3 Innovation Capacity and Capability Building

At initiation of the partnership a lot of uncertainty was observed, considering that members were randomly selected from the community based on their asset base. However, the process of interaction and learning created opportunities for actors to come into contact with each-others' attitudes and behaviors, transforming their attitudes, culture and relationships. More farmers were observed to develop a new understanding of one another and showing willingness to work with each other. A similar observation by Granovetter (1973) indicated that the behavior of individual actors cannot be fully understood unless it is put in context with the actions of others with whom the individuals are connected through various social ties. Farmers' engagement and participation in planned activities, besides their attitude to recruit new members into the partnerships was enough evidence to show improved social capabilities. Social interaction within the partnership provided opportunities for social construction of knowledge in a learning dialogue. Capacities of smallholder sugarcane farmers and organizations were built through knowledge exchange and resource sharing platforms. This helped to enhance relevance of some organizations such as Agriculture Fisheries and Food Authority-Sugar Directorate, Agricultural Finance Corporation (AFC) and Kenya National Farmers' Federation (KENAFF) within the study area.

Continued interactions provided a platform for knowledge incubation, exchange and spillover, thus building smallholders' capacities and capabilities to innovate. Knowledge-generating activities and access to new ideas during interaction enhanced smallholders' capacities to exploit their available resources in developing strategies for food security. As smallholders engaged in platform activities openly sharing knowledge, information, skill and experiences, learning was observed to occur with resultant emergence of indigenous technical knowledge. This agrees with Becker-Ritterspach (2006) that tacit knowledge needs to be dis-embedded, translated, interpreted and integrated in order for learning to occur. Both social and human capability building was evident by emergent of new knowledge in bean selection process and brooding of poultry. Smallholder farmers were also observed to have upgraded their skills in oil palm and soya bean processing. Marketing of these value added products improved smallholder farmers' financial capabilities and opportunities for food security.

Within the structure of their network, innovation partnership actors were observed to influence their success by attracting smallholders from the neighbouring locations to interact and innovate. This is in line with the findings of Boschma, (2005) that proximity between partners has a positive impact on their likelihood to interact and to learn to innovate. It is evident that interactions and networking foster innovation capacities capable of building smallholder farmers' livelihood assets.

### 6.4 Success of individual innovation projects

Interactions of different participants and their ideas, besides the social setting of these interactions and relationships fostered new ways of doing things among the smallholders. Through interaction and learning, opportunities were created for smallholders to articulate their needs and come up with innovations to solve problems that emerged. For example, due to lack of market for their produce a number of farmers had withdrawn from growing soya beans and oil palm. However, through demonstrations and knowledge exchange programs local innovations on soya and oil palm processing arose. This involved production of income generating and value added products from soya beans and oil palm, thereby promoting smallholders' human and financial assets

and broadening opportunities for food security. A similar observation was made by Noorderhaven and Harzing (2008) that knowledge is strongly tied to activities or practices, outside of which it has little relevance. Smallholders' interactions in innovation partnerships are critical to creation of new knowledge and innovation likely to build their livelihood assets and broaden opportunities for food security.

Interactions and application of new knowledge led to emergence of new ways of growing arrow roots. New knowledge of growing arrow roots in highland areas and potted bags was found appropriate in promoting smallholders' financial assets and food security. These innovations allowed for arrow roots production anytime and anywhere, including urban settings. Application of new knowledge was observed to be of economic importance especially in control moles, the most problematic arrow roots' pest. Other individual innovations included adoption of new and more economic systems of vegetables production that enhanced natural resource management besides promoting income and food security. Emergence of innovative hand-cleaning equipment developed from locally available material was essential in maintenance of good health and sanitation, critical to food and nutrition security. In addition, farmers adopted new ways of bricks production, thereby generating income from sales besides improving their physical assets such as housing. This implies that application of innovative ideas emerging from interactions are critical in improving smallholders' social, human, physical, natural and financial assets, consequently broadening opportunities for food security.

## 7. Conclusion

Partnerships are an indispensable mechanism in building smallholder farmers' resilience and creating opportunities for enhancing their livelihood strategies. Facilitation of partnerships that are well managed and foster interactions and innovation are therefore critical for smallholder farming households. By strengthening innovation partnerships through action learning process, smallholder farmers are able to access resources and assets not available to individual producers working in isolation, and consequently broaden opportunities for food security. It was evident through the study that partnerships leverage resources, build capabilities, strengthen relationships, and promote change. In addition to getting access to knowledge and sharing their experiences, smallholder sugarcane farmers were observed to expand their operations cost-effectively and gain entry to otherwise inaccessible markets. This provides opportunities to build their livelihood assets and promote food security.

To capture food security opportunities created by the growing population, it is therefore essential that governments develop and support policies that forge strong innovation partnerships and foster interactions, learning and innovation among smallholder farming households. Integrating the innovation partnerships facilitation into sugar industry research and extension agendas may offer opportunities to minimize exclusion and smallholders' vulnerability, thereby promote innovative capacities for sustainable crop production and food security. There is need for further studies to understand how to effectively integrate interactive learning and innovation across the sugar value chain and what impact this will have on competitiveness of the sugar industry in Kenya.

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